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IN THE CLAIMS:

1. (Currently Amended) A method for processing a specimen using a plasma, comprising the steps of:

generating a plasma in a processing chamber in which the specimen is disposed; and

processing the specimen with the plasma generated in the processing chamber, wherein

~~the step of processing of the specimen further comprises:~~

an irradiation step-operation for projecting and scanning a light beam into the processing chamber through an observation window of the processing chamber;

a detection step-operation for detecting a light of the projected light beam which is reflected from an inside wall of the processing chamber, the light being detected by separating a light component from light emanated from the plasma and light reflected from the inside wall by use of a spectroscope; and

a signal processing step-operation for obtaining information on a state of contamination of the inside wall of the processing chamber, by processing a signal obtained at the detection step by referring to a database storing predetermined relationships between a signal obtained from said detection of light from said inside wall and a state of contamination of said inside wall.

2. (Currently Amended) A method for processing a specimen using a plasma according to Claim 1, ~~further comprising~~

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a control ~~step~~operation for controlling the plasma processing of the specimen, based on the information on the state of contamination of the inside wall obtained at the signal processing ~~step~~operation.

3. (Currently Amended) A method for processing- a specimen using a plasma according to Claim 1, wherein at the detection~~step~~operation, a specular reflection component of the reflected light from the inside wall of the processing chamber is formed by an imaging optical system, and detected by a detector.

4. (Currently Amended) A method for processing a specimen using a plasma according to Claim 3, wherein at the detection~~step~~operation, when the specular reflection component of the reflected light is formed by an imaging optical system through the observation window and detected by a detector, a light generated from the plasma in the processing chamber is cut off by a filter.

5. (Currently Amended) A method for processing a specimen using a plasma according to Claim 1, wherein at the irradiation~~step~~operation, when the beam is projected into the inside of the processing chamber and scanned so as to be projected onto a plurality of locations on the inside wall of the processing chamber.

6. (Currently Amended) A method for processing a specimen using a plasma according to Claim 1, wherein projecting the light beam into the inside of the

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processing chamber at the irradiation step-operation and detecting the reflected light at the detection step-operation are conducted through the same observation window.

7. (Currently Amended) A method for processing a specimen using a plasma according to Claim 1, wherein at the detection-step operation, the reflected light from the inside wall of the processing chamber varies in accordance with a variation in the state of irregularity of the inside wall of the processing chamber.

8. (Currently Amended) A method for processing a specimen using a plasma according to Claim 1, wherein at the irradiation-step operation, intensity of the light beam is modulated by a desired frequency and the light beam is projected into the inside of the processing chamber through the observation window.

9. (Currently Amended) A method for processing a specimen using a plasma according to Claim 8, wherein at the signal processing-step operation, information on the state of contamination of the inside wall of the processing chamber is obtained by extracting a light component which has a frequency which is the same as the desired frequency utilized for modulation.

10. (Currently Amended) A method for processing a specimen using a plasma according to Claim 1, wherein at the detection-step operation, a light image limited by a diaphragm placed at an imaging position of the imaging optical system is received by a detector.

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11. (Currently Amended) A method for processing a specimen using a plasma according to Claim 1, wherein at the irradiation-~~step~~ operation, the light beam to be projected into the inside of the processing chamber has a desired wavelength component, and at the detection-~~step~~ operation, the desired wavelength component is separated from the reflected light.

12. (Currently Amended) A method for processing a specimen using a plasma, comprising ~~the steps of~~:

generating a plasma in a processing chamber in which a specimen is disposed;

processing the specimen with the plasma generated in the processing chamber;

wherein the ~~step of processing of the~~ specimen further comprises:

projecting a light beam into the inside of the processing chamber through an observation window;

splitting light reflected from the inside of the processing chamber in response to the projected light beam and passed through the observation window into at least two components;

obtaining information on suspended foreign material in the processing chamber by detecting a first one of the components of the split light through an optical unit which is in a predetermined relation of imaging with an inside of said plasma; and

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obtaining information on a state of contamination of an inside wall of the processing chamber by detecting ~~the other~~ a second one of the components of the split light through an optical unit which is in a predetermined relation of imaging with said inside wall.

13. (Currently Amended) A method for processing a specimen using a plasma according to Claim 12, ~~further comprising a step of controlling the plasma processing of the specimen, based on information on the suspended foreign material in the processing chamber and information on the state of contamination of the inside wall of the processing chamber.~~

14. (Currently Amended) A method for processing a specimen using a plasma according to Claim 12, wherein at the ~~step of projecting~~ operation, the light ~~beam, intensity beam intensity~~ of the light beam is modulated by a desired frequency and the light beam is projected into the inside of the processing chamber.

15. (Currently Amended) A method for processing a specimen using a plasma according to Claim 14, wherein at the ~~step of obtaining the information on the suspended foreign material, information obtaining operation~~, information on the suspended foreign material in the processing chamber is obtained by extracting a light component which has a frequency which is the same as the desired- utilized for modulation frequency from the first one of the components of the split light.

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16. (Currently Amended) A method for processing a specimen using a plasma according to Claim 14, wherein at the ~~step of obtaining the information on the state of contamination of the inside wall of the processing chamber, information~~ obtaining operation, information on the state of contamination of the inside wall of the processing chamber is obtained by extracting a component of a desired- frequency from the ~~other-second one~~ of the components of the split light.

17. (Currently Amended) A method for processing a specimen using a plasma according to Claim 12, wherein both of the light beam to be projected into the inside of the processing chamber at the projection step-operation, and the reflected light from the inside of the processing chamber at the step of splitting of the reflected light, pass through the same observation window

18. (Currently Amended) A method for processing a specimen using a plasma according to Claim 12, wherein at the ~~step of obtaining of~~ the information on the state of contamination of the inside wall of the processing chamber by detecting the ~~other-second one~~ of the components of the split light, a scattered reflected light component from the inside wall of the processing chamber is cut off by a spatial filter.

19. (Withdrawn) An apparatus for processing an in-process substrate by generating a plasma, comprising:

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a processing chamber with an observation window, in which the in-process substrate is disposed;

plasma generating means for generating a plasma in the inside of the processing chamber;

irradiation means for projecting a light beam into the inside of the processing chamber through the observation window;

detection means for detecting the light that has been projected by the irradiation means and reflected by the inside wall of the processing chamber; and

processing means for obtaining information on the state of contamination of the inside wall of the processing chamber by processing a signal obtained through detection of the reflected light by the detection means.

20. (Withdrawn) A plasma processing apparatus according to Claim 19, further comprising control means for controlling the plasma processing of the in-process substrate, based on information on the state of contamination of the inside wall of the processing chamber that has been obtained by the processing means.

21. (Withdrawn) A plasma processing apparatus according to Claim 19, wherein the irradiation means projects the light beam into the inside of the processing chamber in a scanning manner.

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22. (Withdrawn) A plasma processing apparatus according to Claim 19, wherein the irradiation means projects a light beam intensity-modulated with a desired frequency into the inside of the processing chamber.

23. (Withdrawn) A plasma processing apparatus according to Claim 22, wherein the processing means obtains the information on the state of contamination of the inside wall of the processing chamber by extracting the intensity modulated frequency component from signals obtained through detection of the reflected light by the detection means.

24. (Withdrawn) A plasma processing apparatus according to Claim 19, wherein the detection means is equipped with an imaging optical system and detects an optical image of the reflected light from the inside wall of the processing chamber.

25. (Withdrawn) A plasma processing apparatus according to Claim 24, wherein the detection means detects a speckle pattern image.

26. (Withdrawn) A plasma processing apparatus according to Claim 24, the detection means detects an light image that is restricted by a diaphragm being set at an imaging position of the imaging optical system.

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27. (Withdrawn) A plasma processing apparatus according to Claim 19, wherein the detection means detects the reflected light through the observation window, through which the irradiation means made the light beam pass.

28. (Withdrawn) A plasma processing apparatus according to Claim 19, wherein the irradiation means and the detection means share a wave plate, by which the irradiation means changes a polarization state of the light beam to be projected into the inside of the processing chamber by the irradiation means and also by which the detection means changes a polarization state of the reflected light from the inside of the processing chamber.

29. (Withdrawn) An apparatus for processing an in-process substrate by generating a plasma, comprising:

a processing chamber with an observation window, in which an in-process substrate is disposed;

plasma generating means for generating a plasma in the inside of the processing chamber;

irradiation means for projecting a light beam into the inside of the processing chamber through the observation window;

branching means for branching reflected light from the inside of the processing chamber resulting from the light projected by the irradiation means and passed through the observation window;

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foreign-material detecting means for obtaining information on suspended foreign materials in the processing chamber by detecting one of portions into which the reflected light has been branched by the branching means; and

state-of-contamination detecting means for obtaining information on the state of contamination of the inside wall of the processing chamber by detecting the other of portions into which the reflected light has been branched by the branching means.

30. (Withdrawn) A plasma processing apparatus according to Claim 29, further comprising, control means for controlling plasma processing for the in-process substrate, based on both of information on the suspended foreign materials in the processing chamber that has been detected by the foreign-material detecting means and information on the state of contamination of the inside wall of the processing chamber that has been detected by the state-of-contamination detecting means.

31. (Withdrawn) A plasma processing apparatus according to Claim 29, wherein the irradiation means projects light beam intensity-modulated by a desired frequency into the inside of the processing chamber.

32. (Withdrawn) A plasma processing apparatus according to Claim 31, wherein the foreign-material detecting means obtains information on the suspended foreign materials in the processing chamber by extracting a component of a desired

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intensity-modulated frequency from signals obtained by detecting one of portions into which the reflected light has been branched by the branching means.

33. (Withdrawn) A plasma processing apparatus according to Claim 31, wherein the state-of-contamination detecting means obtains information on the state of contamination of the inside wall of the processing chamber by extracting a component of a desired intensity-modulated frequency from signals obtained by detecting the other of portions into which the reflected light has been branched by the branching means.

34. (Withdrawn) A plasma processing apparatus according to Claim 29, wherein at irradiation means, both the light beam projected into the inside of the processing chamber and the reflected light from the inside of the processing chamber that has been branched by the branching means, are pass through the same observation window of the processing chamber.

35. (Withdrawn) A plasma processing apparatus according to Claim 29, wherein the state-of-contamination detecting means is equipped with a spatial filter that cuts off a scattered reflected light component from the inside wall of the processing chamber, among the other of portions into which the reflected light has been branched by the branching means.